

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference MI22-2241	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 03/02288	International filing date (day/month/year) 24/01/2003	(Earliest) Priority Date (day/month/year) 05/02/2002
Applicant MICRON TECHNOLOGY, INC.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 6 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

1



None of the figures.

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G03F1/00 G03F1/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G03F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC, IBM-TDB, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CUI Z ET AL: "PARTIAL RIM: A NEW DESIGN OF RIM PHASE SHIFT MASK FOR SUBMICRON CONTACT HOLES" OPTICAL / LASER MICROLITHOGRAPHY 8. SANTA CLARA, FEB. 22 - 24, 1995, PROCEEDINGS OF SPIE. OPTICAL / LASER MICROLITHOGRAPHY, BELLINGHAM, SPIE, US, vol. 2440, 22 February 1995 (1995-02-22), pages 541-549, XP000988760 ISBN: 0-8194-1788-2	1,2,27
Y	the whole document	5-11, 28-96
X	EP 0 395 425 A (FUJITSU LTD) 31 October 1990 (1990-10-31)	1,2,4,27
Y	page 10, line 53 -page 11, line 7; figure 18	30-96
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

15 January 2004

Date of mailing of the international search report

23/01/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Haenisch, U

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 629 113 A (WATANABE HISASHI) 13 May 1997 (1997-05-13) column 19, line 17 - line 33; figures 21C,21D ----	12,14, 19-22,30
Y	US 6 007 324 A (LIN SHY-JAY ET AL) 28 December 1999 (1999-12-28) the whole document ----	28-96
Y	EP 0 583 942 A (AMERICAN TELEPHONE & TELEGRAPH) 23 February 1994 (1994-02-23) the whole document ----	5-11
A	US 5 384 219 A (DAO GIANG T ET AL) 24 January 1995 (1995-01-24) the whole document ----	12
A	US 5 300 379 A (RODRIQUEZ RUBEN A ET AL) 5 April 1994 (1994-04-05) ----	
A	US 5 897 975 A (AHN CHANG NAM ET AL) 27 April 1999 (1999-04-27) -----	

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-30

RIM type phase shifting mask and method for making it. The method is characterized by a single resist process with two removal steps to create the pattern and the RIM features.

1.1. Claims: 34-52

method for making a RIM phase shifting structure characterized by a sequence of successive steps.

1.2. Claims: 53-59

method for making a RIM type phase shifting structure characterized by a particular doping step.

1.3. Claims: 60-96

method for making a RIM type phase shifting structure characterized by the use of at least two separate phase shifting layers of different composition.

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0395425	A	31-10-1990	DE 69028871 D1	21-11-1996
			DE 69033996 D1	26-09-2002
			DE 69033996 T2	05-12-2002
			EP 0395425 A2	31-10-1990
			EP 0653679 A2	17-05-1995
			JP 2862183 B2	24-02-1999
			JP 3267940 A	28-11-1991
			JP 3007846 B2	07-02-2000
			JP 9101616 A	15-04-1997
			JP 3322837 B2	09-09-2002
			JP 11249282 A	17-09-1999
			JP 3320062 B2	03-09-2002
			JP 2001356468 A	26-12-2001
			JP 3417939 B2	16-06-2003
			JP 2002236351 A	23-08-2002
			KR 9405282 B1	15-06-1994
			US 5489509 A	06-02-1996
			US 5674646 A	07-10-1997
			US 5624791 A	29-04-1997
			US 5786115 A	28-07-1998
US 5629113	A	13-05-1997	US 5605775 A	25-02-1997
			DE 69131497 D1	09-09-1999
			DE 69131497 T2	30-03-2000
			EP 0464492 A1	08-01-1992
			JP 4218046 A	07-08-1992
			KR 9502871 B1	27-03-1995
			US 5578402 A	26-11-1996
US 6007324	A	28-12-1999	NONE	
EP 0583942	A	23-02-1994	DE 69324636 D1	02-06-1999
			DE 69324636 T2	23-09-1999
			EP 0583942 A2	23-02-1994
			ES 2132192 T3	16-08-1999
			HK 1008699 A1	24-03-2000
			JP 7295200 A	10-11-1995
			SG 47405 A1	17-04-1998
			US 5405721 A	11-04-1995
US 5384219	A	24-01-1995	US 5348826 A	20-09-1994
			US 5302477 A	12-04-1994
			US 5300379 A	05-04-1994
			US 5700602 A	23-12-1997
			US 5789118 A	04-08-1998
			GB 2269915 A ,B	23-02-1994
			JP 6289594 A	18-10-1994
US 5300379	A	05-04-1994	US 5348826 A	20-09-1994
			US 5384219 A	24-01-1995
			US 5700602 A	23-12-1997
			US 5789118 A	04-08-1998
US 5897975	A	27-04-1999	KR 158904 B1	01-02-1999
			DE 19545163 A1	05-06-1996
			GB 2295694 A ,B	05-06-1996